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2502 Robertson Road, Santa Clara, CA 95051 (US). **NORTON, Adam, E.**; 3696 Ross Road, Palo Alto, CA 94303 (US). **TUITJE, Holger, A.**; 4970 Seneca Park Loop, Fremont, CA 94538 (US).

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(74) Agents: **STALLMAN, Michael, A.** et al.; Stallman & Pollock L.L.P., 121 Spear Street, Suite 290, San Francisco, CA 94105 (US).

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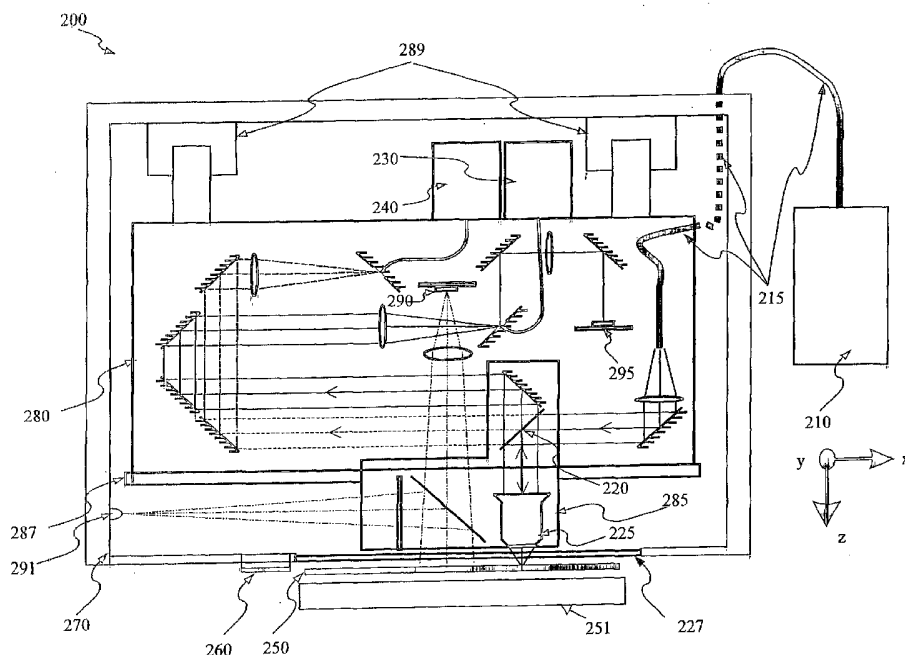
(71) Applicant: **THERMA-WAVE, INC.** [US/US]; 1250 Reliance Way, Fremont, CA 94539 (US).

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(72) Inventors: **SEZGINER, Abdurrahman**; 105 Forest Hill Drive, Los Gatos, CA 95032 (US). **JOHNSON, Kenneth**;

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: POSITION-DEPENDENT OPTICAL METROLOGY CALIBRATION



(57) Abstract: An optical inspection tool including a movable optics system is characterized in terms of position and wavelength dependent quantities over a range of motion. Once the position-dependent quantities are determined at various wavelengths and positions, they are stored and used to interpret data from test wafers having an unknown metrology. A portion of the characterization of the optical system may be accomplished by using tinted black glass to provide a non-reflective reference.

WO 2003/050514 A3

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01N21/93 G01N21/95

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01N H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| A | US 5 747 813 A (MALLORY CHESTER L ET AL) 5 May 1998 (1998-05-05) * cited in the application * abstract; figure 2 --- | 1-9, 38-40 |
| A | US 5 321 495 A (HAGIWARA TAKASHI ET AL) 14 June 1994 (1994-06-14) abstract; figure 1 --- | 1-9, 38-40 |
| A | PATENT ABSTRACTS OF JAPAN vol. 016, no. 447 (E-1266), 17 September 1992 (1992-09-17) -& JP 04 158540 A (NEC KYUSHU LTD), 1 June 1992 (1992-06-01) abstract; figures 1,2 --- -/-- | 1-9, 38-40 |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
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- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

13 October 2003

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Croucher, J

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | PATENT ABSTRACTS OF JAPAN vol. 013, no. 218 (E-761), 22 May 1989 (1989-05-22) -& JP 01 030242 A (OKI ELECTRIC IND CO LTD), 1 February 1989 (1989-02-01) abstract; figure 1 ---- | 22 |
| X | PATENT ABSTRACTS OF JAPAN vol. 014, no. 210 (E-0922), 27 April 1990 (1990-04-27) -& JP 02 047823 A (CANON INC), 16 February 1990 (1990-02-16) abstract ---- | 22 |
| A | US 5 144 524 A (KRUGER JAMES B ET AL) 1 September 1992 (1992-09-01) abstract ----- | 27-37 |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 02/39733

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-9 and 38-40

Calibration by moving an optics system to different positions relative to a wafer support structure, measuring at different positions using different wavelengths, and determining position-dependent calibration information.

2. Claims: 10-26

A chuck for supporting a wafer to be measured comprising a wafer support structure and a reference element fixed to the chuck.

3. Claims: 27-37

Calibration by positioning a reference element in the optical path of a probe beam so that specular reflections of the probe beam from the surface of the reference element fall outside the detector optics collection angle.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/39733

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
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